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Strengthening Pluralistic Agricultural Information Delivery Systems in India

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Abstract

The study on agricultural information flow has revealed that only 40 per cent farm households access information from one or the other source. The popular information sources among farmers have been reported to be fellow progressive farmers and input dealers, followed by mass media. The public extension system has been found to be accessed by only 5.7 per cent households. Only 4.8 per cent of the small farmers have access to public extension workers as compared to 12.4 per cent of large farmers. The sector-wise study on the type of information, sought has revealed that a majority of the farmers have sought information on seed (32-55%) in the cultivation sector; on health care (26-54 %) in animal husbandry; and on management and marketing (8-46 %) in fisheries. Regarding adoption of information by farmers, input dealers and other progressive farmers have depicted greater influence mainly due to easy and convenient access to these sources. The study has suggested promotion of farmers-led extension and strengthening of public extension services to improve coverage and efficiency of agricultural information delivery systems.

Introduction

The public extension system had played an important role in accelerating agricultural growth during the green revolution period by transferring technology and farm-management related information, generated by the National Agricultural Research System (NARS), to the farmers. However, the economic and agricultural environment has considerably changed since then. Market liberalization and globalization are driving the Indian agriculture out of staple-based subsistence system towards a high-value, information-intensive commercial enterprise. Today, the farmers are increasingly looking for frequent interactions with various information sources not only to carry out their farming and marketing tasks efficiently but also to ensure delivery of safe and quality agricultural

products to consumers. The emerging information requirement is demand-driven, as opposed to supply-led public information system during the green revolution era. The challenge is to improve the accessibility of farmers to information and its relevance in the agricultural development (Sharma, 2002).

Both public and private extension systems are innovating approaches for the transfer of technology and information to farmers so as to empower them to face the challenges of market liberalization and globalization. The recent information revolution by Information and Communication Technology (ICT) has potential to provide a greater quantum of information, covering a wide range of subjects in the shortest possible time. But, to harness this potential for agricultural development, it is essential to understand the existing sources of information and their utility and relevance in terms of outreach, subject matter coverage and utilization by the farmers.

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This paper endeavours to understand the geometry of information flow in the Indian agriculture system. Specifically, the paper has examined (i) geometry of information flow across farm categories, (ii) influence of different information sources on adoption of technologies, and (iii) policy implications of the changing geometry of information flow for the public and private extension systems. The paper has been organized in four sections. The next section describes data used in this study. Information sources and farmers' access to their coverage and utilization pattern have been discussed in section III. Concluding remarks have been made in the last section.

Data and Methodology

In this study, household level data from a survey on the situation assessment of farmers conducted by the National Sample Survey Organization (NSSO) in its 59th round in 2003 have been used. The survey covered 51,770 farm households, spread over 6638 villages throughout the country.

Based on landholding size, farm households were classified into three categories, viz. small (< 2 ha), medium (2-4 ha) and large (>4 ha), to study the bias, if any, in the information dissemination processes being followed by the public and private extension systems. The data concerning access, type, trial and use of information with regard to agricultural technologies were used. The tabular and percentage analyses were used to explain the results of the study.

Results and Discussion

The National Agricultural Research System (NARS) of the country comprising ICAR, SAUs, etc. has generated a number of technologies and huge amount of novel information through concerted research efforts. However, a considerable proportion of this knowledge remains within the confines of research institutes due to one or the other reason, including poor linkages between research and extension systems (Reddy and Ankaiah, 2005). In this context, selection and use of appropriate information sources by different categories of farmers is of great significance.

(i) Sources of Information

Farmers receive agricultural information from a multitude of sources, such as extension agencies, mass media, fellow farmers, input dealers, etc. These sources can be classified based on (i) whether the information flow from a source is one-way or two-way process, and (ii) the specificity of information, that is multi-purpose or specialized. Radio, television and newspapers are one-way multipurpose communication sources; village fairs are two-way multi-purpose sources; trainings, *Krishi Vigyan Kendras*, field demonstrations, study tours, extension workers, para-technicians/ private agencies /NGOs, input dealers, fellow progressive farmers, credit agencies, primary cooperative societies and output buyers/food processors are the two-way specialized information sources.

The distribution of farm households accessing different sources of information on modern farming technologies has been given in Table 1. At the national level, only 40 per cent farm households were estimated to access agricultural information from one or the other source. The study has revealed that the biggest information source was the fellow progressive farmers, accessed by 16.7 per cent farmers, followed by input dealers (13.1%), radio (13.0%), television (9.3%) and newspapers (7.0%). It was surprising to find that the much talked about public extension system was the source of information for only 5.7 per cent farm households. Primary cooperative societies, output buyers/ food processors, village fairs, government demonstrations, and credit agencies each served as a source of information only to 2-3 per cent of farmers.

In India, though it is generally claimed that public extension is system the predominant source of farm information dissemination (Nirmala *et al.*, 1995), it was disappointing to note that it was accessed only by a small proportion of farm households. Though it is difficult to pinpoint precisely the causes of limited accessibility of information by farmers from the public extension systems, lack of manpower and operational autonomy could be the possible reasons the observed for inefficiency in delivery of information and services. Further, with intensification and

diversification of agriculture, the specialized two-way interactive source, 'input dealers', has emerged as the second biggest source of information dissemination. Input dealers gather information from different sources. Sugumar *et al.* (1994) have observed that 95 per cent of input dealers provide information to farmers based on their knowledge and experience gained through discussions with representatives of fertilizer or pesticide firms, and of these, 56 per cent were also found to consult extension workers. By providing information, input dealers try to earn goodwill of the farmers and to some extent are able to promote their business relationships with them.

Though mass media are the one-way multipurpose communication sources, these have been found to be the important sources of information dissemination. In India, the first agricultural telecast started under the programme *Krishi Darshan* in 1967. Recently, the Ministry of Agriculture, Government of India, has made arrangements with the *Gyan Darshan* and *Gyan Vani* of the Indira Gandhi National Open University to

telecast/ broadcast agricultural programs regularly. Apart from this, regional TV and Radio stations air regular agricultural programs. Even in agriculturally-backward states like Jharkhand, a majority of the semi-modern tribal women (90 per cent) were found having used radio, television and film to get information on improved technology of rice production, viz. varieties, nursery management and transplantation (Ratan *et al.*, 2005).

(ii) Access to Information by Farm-size

Many a past studies have reported that small and large farmers have differential access to information sources (Ernest, 1973; Ramachandran, 1974; Singh, 1976). Variations in utilization of information sources by different categories of farm households have been reported in Table 1. A perusal of Table 1 revealed that access to information from any source increased with increase in farm-size. This variation was more pronounced in the case of extension workers, TV and primary co-operative societies. Though the public extension system is considered as the most credible source of information for small

Table 1. Access to information from different sources across farm-sizes in India

(per cent)

| Sources | Farm-size | | | All India |
|--|-----------|--------|-------|-----------|
| | Small | Medium | Large | |
| Any source | 38.2 | 51.0 | 53.6 | 40.5 |
| Other progressive farmers | 16.0 | 20.2 | 20.8 | 16.8 |
| Input dealers | 12.6 | 14.8 | 18.3 | 13.2 |
| Radio | 12.4 | 16.4 | 16.8 | 13.1 |
| TV | 7.7 | 15.3 | 22.4 | 9.4 |
| Newspaper | 6.0 | 10.3 | 15.9 | 7.0 |
| Extension workers | 4.8 | 9.8 | 12.4 | 5.8 |
| Primary cooperative societies | 3.0 | 6.2 | 8.0 | 3.6 |
| Output buyers/food processors | 2.1 | 3.6 | 3.4 | 2.3 |
| Government demonstrations | 1.7 | 3.4 | 4.6 | 2.1 |
| Village fairs | 2.0 | 2.4 | 2.38 | 2.0 |
| Credit agencies | 1.6 | 2.8 | 3.4 | 1.9 |
| Others | 1.6 | 2.1 | 2.0 | 1.7 |
| Participation in training programs | 0.7 | 1.9 | 2.3 | 0.9 |
| <i>Krishi Vigyan Kendras</i> | 0.6 | 1.0 | 1.7 | 0.7 |
| Para-technicians/private agencies/NGOs | 0.5 | 1.0 | 0.8 | 0.6 |
| Farmers' study tours | 0.2 | 0.3 | 0.6 | 0.2 |

Source: Computed by authors from NSSO data 59th round

farmers (Karippai *et al.*, 1995), it is often criticized for its bias against small farmers (Ernest, 1973; Ramachandran; 1974 and Singh, 1976). The figures presented in Table 1 substantiated this statement.

The extension workers were found to be the source of information to only about 4.8 per cent of small farmers, as compared to 12.4 per cent of large farmers. For small farmers, 'other progressive farmers' and 'input dealers' were the most popular sources of information, probably because of higher cost of information acquisition from other sources. However, radio appeared to be one of the most important information sources because of its easy access to the poor. For medium and large farmers, radio, television and newspaper were as important information sources as input dealers and other progressive farmers.

(iii) Type of Information

In addition to sources of information for the total farm activities, it was considered imperative to examine these sources of information by sector and types of information. In terms of sector, agricultural activities were divided into three categories, viz. cultivation, animal husbandry and fisheries. Information needs of each sector were further classified into 5-6 categories. These results have been presented in Table 2. Among these sectors, farmers accessed more information on cultivation, followed by animal husbandry and fisheries.

In the cultivation sector, irrespective of information source, a majority of the farmers sought information on seed (32-55%), followed by fertilizer application (24-41%) and plant protection (14-18%). Extension workers were the most sought sources for information on seed (55%), followed by TV (49%) and radio (45%). For fertilizer application, most of the farmers received information from input dealers (41%), followed by other progressive farmers (31%). Newspapers and radio were the important sources for getting information on plant protection chemicals. It was understandable that for information about technological innovation (e.g. variety) and/ or knowledge-intensive technology (e.g. plant protection), farmers opted for either extension workers or mass media sources. Among the mass

media sources, the information providers were usually from research institutes or state agricultural universities. The mass media, public agricultural extension and advisory services had played important roles in introducing and disseminating new technologies and farming practices to farmers (Berg and Jiggins, 2007). The crop variety and plant protection chemicals being critical inputs, information about them was sought through newspapers, TV, radio, other progressive farmers, extension workers and input dealers. But, for routine inputs like fertilizers, farmers preferred easily accessible sources like input dealers and other progressive farmers.

In the animal husbandry sector, healthcare being an important aspect appeared as the most important information need of the farmers. The proportion of farm households accessing information from different sources was maximum on 'healthcare' (26-54%), followed by 'feeding practices' (14-42%), and breeding (1-33%). For information on animal health, most farm households relied on other progressive farmers (54%), and extension workers (53%). For information on feed, most farmers availed information from input dealers (42%).

In the fisheries sector, most farmers sought information on 'management and marketing' (8-46%) and 'seed production' (2-27%). For seed production, a higher number of farmers contacted the extension workers (27%) and input dealers (27%), probably because these sources, apart from providing information, also supplied fingerlings. Usually, wherever information was supplemented with inputs, farmers preferred those sources to save search and acquisition costs on information from other sources.

(iv) Efficiency of Sources in Trial and Adoption of Information

Adoption behaviour of a farmer can be conceptualized as a process comprising a number of successive stages: awareness-interest-evaluation-trial-adoption. In this context, the NSSO dataset combines awareness, interest and evaluation (mental) stages pertaining to information. At the awareness stage, an individual becomes aware about

Table 2. Sector-wise accessing of various types of information from different sources in India

(in per cent)

| Sector | Nature of information | Extension workers | TV | Radio | News-papers | Other progressive farmers | Input dealers |
|------------------|------------------------|-------------------|------|-------|-------------|---------------------------|---------------|
| Crop cultivation | Improved seed variety | 55.1 | 49.3 | 44.5 | 31.6 | 39.6 | 39.1 |
| | Fertilizer application | 25.9 | 24.8 | 29.3 | 24.0 | 31.3 | 41.2 |
| | Plant protection | 14.3 | 14.2 | 15.8 | 18.0 | 15.1 | 13.9 |
| | Farm machinery | 1.1 | 1.3 | 0.8 | 3.7 | 1.0 | 0.4 |
| | Harvesting/ marketing | 1.6 | 3.7 | 3.1 | 12.6 | 7.2 | 2.5 |
| | Others | 2.0 | 6.6 | 6.4 | 10.2 | 5.8 | 2.8 |
| Animal husbandry | Breeding | 13.6 | 33.4 | 20.9 | 20.3 | 20.2 | 1.2 |
| | Feeding | 16.3 | 14.3 | 18.3 | 18.5 | 14.7 | 42.1 |
| | Healthcare | 52.7 | 33.7 | 45.2 | 35.8 | 53.8 | 25.6 |
| | Management | 5.1 | 6.4 | 3.6 | 6.6 | 9.3 | 12.9 |
| | Others | 12.3 | 12.3 | 12.0 | 18.7 | 2.0 | 18.3 |
| Fishery | Seed production | 27.2 | 17.0 | 1.5 | 8.8 | 10.5 | 26.8 |
| | Harvesting | 2.2 | 8.3 | 15.6 | 4.4 | 6.0 | 11.1 |
| | Management & marketing | 7.9 | 20.9 | 21.7 | 33.1 | 31.4 | 46.5 |
| | Others | 62.8 | 53.9 | 61.2 | 53.6 | 52.2 | 15.6 |

Source: Computed by authors from NSSO data 59th round

information, such as hybrid seed or new pesticide. The trial stage is characterized by a small-scale experimentation and the adoption stage is characterized by a large-scale and continued use of a technology.

Some insights into the process of adoption of information can be had from Table 3. Ranking of information sources (based on percentage of farmers accessing a particular source of information) was pretty much the same at all the stages of adoption process, i.e. access, trial and adoption. The 'other progressive farmers', 'input dealers', 'radio' and 'TV' remained the important sources of information at every stage. Input dealers and other progressive farmers were most effective in coverage and also in influencing adoption of information. The proportion of farm households for these stages with respect to extension workers was less than 5 per cent and for *Krishi Vigyan Kendras*, para-technicians and farmers' study tours, it was negligible. Despite these differences, some important insights were obtained from the analysis of trial and adoption by the households who had accessed information. Though at both trial and adoption stages, 'other progressive

farmers' and 'input dealers' remained most important; 'public-funded research and extension systems' too appeared credible. Other sources such as radio and TV were found less important, may be because of their one-way flow of information, and lower efficiency in convincing the farmers leading to adoption.

The analysis has revealed that the functioning of public extension services should be improved, primarily by enhancing their access to farm households. On the otherhand, public-sponsored other extension methods like training programs, study tours, etc. were found to have least influence on the adoption of modern farm technologies. It is to be understood that since formal extension sources are not readily accessible, farmers opt for easily approachable sources like 'other progressive farmers' and 'input dealers', though the information from these sources may not be of high quality, is less authentic and usually has the element of bias.

Adoption of Type of Information

Depending on the attributes of a technology, farm households seek information from different sources.

Table 3. Efficiency of sources in adoption of information

| Sl No. | Sources | Percentage of total households | | | Percentage of accessing households | |
|--------|-------------------------------------|--------------------------------|-------|-------|------------------------------------|-------|
| | | Access | Trial | Adopt | Trial | Adopt |
| 1 | Participation in training programs | 0.9 | 0.6 | 0.6 | 66.1 | 64.5 |
| 2 | <i>Krishi Vigyan Kendras</i> | 0.7 | 0.5 | 0.5 | 66.9 | 66.2 |
| 3 | Extension workers | 5.8 | 3.8 | 3.6 | 65.4 | 62.5 |
| 4 | TV | 9.4 | 5.0 | 5.0 | 53.3 | 53.1 |
| 5 | Radio | 13.1 | 7.4 | 7.1 | 56.4 | 54.5 |
| 6 | Newspapers | 7.0 | 3.8 | 3.8 | 54.1 | 53.8 |
| 7 | Village fairs | 2.0 | 1.0 | 1.0 | 47.2 | 48.0 |
| 8 | Govt. demonstrations | 2.1 | 1.2 | 1.2 | 59.2 | 60.4 |
| 9 | Input dealers | 13.2 | 10.7 | 10.8 | 81.5 | 81.7 |
| 10 | Other progressive farmers | 16.8 | 13.9 | 14.3 | 82.8 | 85.1 |
| 11 | Farmers' study tours | 0.2 | 0.1 | 0.1 | 48.8 | 52.3 |
| 12 | Para-technician/private agency/NGOs | 0.6 | 0.3 | 0.3 | 55.5 | 56.6 |
| 13 | Primary cooperative societies | 3.6 | 2.5 | 2.5 | 70.0 | 68.4 |
| 14 | Output buyers/food processors | 2.3 | 1.6 | 1.5 | 67.6 | 62.8 |
| 15 | Credit agencies | 1.9 | 1.0 | 0.9 | 51.4 | 49.0 |
| 16 | Others | 1.7 | 1.1 | 1.2 | 67.5 | 68.6 |

Source: Computed by authors from NSSO data 59th round

Table 4 provides sectorwise details about the type and use of information accessed by farm households. In the cultivation sector, irrespective of the source (except input dealers), a higher proportion of farmers had gone for adoption of 'fertilizer practices', followed by 'improved seed variety' and 'plant protection'. For getting information on 'fertilizers', sources such as 'other progressive farmers' and 'input dealers' appeared to be more credible.

In the animal husbandry sector, most farmers were found using these sources, especially for accessing information from other progressive farmers and input dealers. In this sector, feeding is a fundamental requirement and healthcare is a critical practice and therefore, these were adopted by most farm households. A study conducted in Uttarakhand has also revealed higher adoption of feeding and healthcare practices by farmers (Arora *et al.*, 2006). For feeding, 'extension workers' and 'other progressive farmers' were the important sources, whereas for healthcare, 'input dealers' and 'other progressive farmers' emerged as significant sources. It was also noted that for information on healthcare,

farmers had more dependence on 'other progressive farmers' than 'extension workers'. It is a matter of concern and has important implications for reorientation of animal health and breeding services.

In the fisheries sector, almost every farmer had used these sources for accessing information on 'harvesting' from the input dealers. In the case of 'seed production', mass media sources, such as newspapers and TV depicted a major influence on farmers. Good quality of fish seed being the basic input, information about the places of their availability helped the farmers in doing profitable fish farming. Unfortunately, the percentage of farmers who had adopted technologies by accessing information through extension workers was observed to be negligible.

Conclusions and Policy Implications

With Indian agriculture being exposed to global changes, precise and timely information on different aspects of farming, particularly modern technologies/practices is becoming a necessity for farmers. Farmers use pluralistic (both public and private)

Table 4. Sectorwise adoption of information accessed from different sources in rural India

(in percentage of accessing households)

| Sector | Nature | Extension workers | TV | Radio | News-papers | Other progressive farmers | Input dealers |
|------------------|------------------------|-------------------|------|-------|-------------|---------------------------|---------------|
| Cultivation | Improved seed variety | 61.6 | 55.9 | 55.5 | 56.0 | 86.1 | 83.3 |
| | Fertilizer application | 69.6 | 61.3 | 59.8 | 58.1 | 86.6 | 83.1 |
| | Plant protection | 66.9 | 54.6 | 58.8 | 58.2 | 85.2 | 89.5 |
| | Farm machinery | 57.7 | 25.1 | 28.1 | 34.9 | 66.9 | 55.6 |
| | Harvesting/ marketing | 55.9 | 42.6 | 47.8 | 64.0 | 81.0 | 48.2 |
| | Others | 25.6 | 27.7 | 26.4 | 31.3 | 75.0 | 53.4 |
| | Breeding | 56.6 | 37.9 | 55.9 | 45.7 | 82.5 | 79.0 |
| Animal husbandry | Feeding | 98.7 | 48.2 | 66.5 | 71.2 | 93.2 | 88.5 |
| | Healthcare | 56.8 | 39.1 | 73.9 | 65.5 | 95.1 | 97.8 |
| | Management | 28.2 | 78.7 | 76.2 | 32.9 | 79.8 | 24.2 |
| | Others | 22.3 | 14.7 | 3.6 | 9.2 | 63.9 | 53.2 |
| Fishery | Seed production | NA | 94.0 | 37.8 | 98.3 | 81.9 | 79.2 |
| | Harvesting | NA | 20.7 | 40.6 | 36.8 | 88.9 | 100.0 |
| | Management & marketing | NA | 55.2 | 59.3 | 65.5 | 83.4 | 26.3 |
| | Others | 18.9 | 14.7 | 19.3 | 27.5 | 51.1 | 20.6 |

NA= Negligible Access; *Source:* Computed by authors from NSSO data 59th round

extension sources for accessing information on agriculture. But, by and large, only 40 per cent of farm households have been found accessing various information sources at all-India level. They have been found to predominantly depend on the private and informal sources like 'other progressive farmers' and 'input dealers', because of their easy and convenient access. But, it is essential to improve the quality of information from these sources. Therefore, imparting training to progressive farmers on technological and management aspects would help in the spread of farmer-led extension. Role of input dealers as information providers is to be recognized and therefore they are to be oriented so that they could serve as local resource persons.

Farmers' access to publicly-funded sources like extension workers, *Krishi Vigyan Kendras*, training programs, study tours is low. These programs are to be made cost-effective and easily accessible to resource-poor farmers and farm-women. Also, the role of *Krishi Vigyan Kendras* is to be redefined to support the ATMA model approach. Reorientation of organizational and functional processes of both

front line and main extension systems is also needed to make substantial improvements in terms of coverage of farmers, capacity of personnel and demand-driven subject matter coverage. Though mass media sources play a significant role in disseminating information, their low impact on adoption of technologies is to be kept in mind. Systematic media planning to reflect demand driven and interactive programs along with appropriate supplementation with formal extension channels (two-way) would improve their effectiveness.

The inter farm-size variations in terms of access to sources is a matter of concern and there is a need for better target group approaches like forming smallfarmers' groups, farmers-based organizations, inclusiveness in training programs by accommodating smallfarmers and women, etc.

It has been found that for vital information on animal healthcare, farmers depend largely on neighbourhood sources (other farmers) than extension workers. This indicates the urgent need to reorient animal health and breeding services to take advantage of the growth in livestock sector. The low

level of access in the case of fisheries sector indicates that it requires more focus from extension services. Though value addition and marketing are part of important strategies for future agricultural growth, poor access and adoption of information on these aspects, irrespective of sectors warrant immediate attention. Since these are all soft technologies (knowledge-based), it is essential that public extension improves its performance in terms of knowledge acquisition and delivery to farmers.

Sources, namely training programs, KVKs, extension workers, demonstrations, and study tours been found to have lower influence on adoption of agricultural technologies in comparison to private informal sources in spite of the fact that public extension system is backed by the organized dissemination processes and manpower. This disturbing trend may possibly be due to mismatch between farmers' demands and information and / or mode of delivery. Public extension has been focusing traditionally on major cereal crops like wheat and rice, that too information on major inputs like seeds, fertilizers and pesticides. But, presently there is an increasing demand for diversified information in terms of crops and across value chain. Also, some technologies like IPM and water management, wherein synchronized adoption by farmers is effective, requires group extension approach. It boils down to the fact that reality check on the status and functioning of public sector extension is essential and there is a need for a paradigm shift in public extension to make it demand-driven and inclusive so as to promote greater uptake of farm technologies to achieve the desired accelerated agricultural growth.

Though pluralistic extension agencies may improve the accessibility of information to farmers, defining and optimizing their role would lead to convergence of services with quality information. Emerging alternative extension approaches are to be recognized. For instance, contract farming provides opportunity for availing integrated services (input and output markets and technologies) across the value chain, especially for new crops, and crops with specific attributes. Similarly, ICT-based initiatives are coming up in a big way to improve mode of delivery of information to farmers. In line with such

developments, public sector extension reforms should include focus on extension reach to the disadvantaged groups, strengthening and up-scaling of new institutional mechanisms, promoting farmer-led extension, and farmer-based organizations. Bottom-up sustainable alternative extension strategies should be the key for extension reforms. However, any complacency in real implementation of extension reforms would lead to withering public extension in India leading to perpetual agricultural crisis, instead of sustainable agricultural development.

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